CURRENT LISTING OF CLAIMS:

1.(Previously Presented) A multiple-input/multiple-output (MIMO) communication system, comprising:

a plurality of constellation points disposed among n real dimensions, wherein each said point lies within one and only one of at least two n-1 real dimensional sub-constellations, wherein n=2M and M is an integer greater than one, said plurality of constellation points embodied in or on a storage media; and

coupled to the storage media, at least one of a processor for mapping a signal to be transmitted to at least some of the plurality of constellation points and a detector for comparing a received signal to at least some of the plurality of constellation points.

2.(Previously Presented) The MIMO communication system of claim 1 wherein M is equal to a number of transmit antennas in a MIMO system.

3.(Previously Presented) The MIMO communication system of claim 1 wherein M=2.

4.(Previously Presented) The MIMO communication system of claim 1 wherein each sub-constellation defines a n-1 dimensional plane, and said planes lie parallel to one another.

5.(Previously Presented) The MIMO communication system of claim 1 wherein the plurality of points are disposed about an arcuate surface and the plurality of sub-constellations comprise at least one pair of sub-constellations each defining x points, each said sub-constellation defining x points being disposed such that an origin of the constellation lies along an axis of symmetry defined by said pair.

6.(Previously Presented) The MIMO communication system of claim 5 wherein the plurality of sub-constellations further comprises an additional sub-constellation defining y points disposed symmetrically about the origin of the constellation, and wherein no other sub-constellation has at least y points.

7.(Previously Presented) The MIMO communication system of claim 1 wherein the plurality of points are disposed among K subsets, wherein the points of each subset are disposed among n real dimensions and wherein each point of a subset lies within one and only one of at least two n-1 dimensional sub-constellations, wherein K is an integer greater than one.

8.(Previously Presented) The MIMO communication system of claim 7 wherein the subsets each define a closed arcuate surface.

9.(Previously Presented) The MIMO communication system of claim 8 wherein the closed arcuate surface defines a sphere.

10.(Previously Presented) The MIMO communication system of claim 9 wherein the spheres are concentric.

11.(Previously Presented) The MIMO communication system of claim 7 wherein a closest distance between points of adjacent subsets is defined by a maximized minimum Kullback-Leibler distance.

12.(Previously Presented) The MIMO communication system of claim 1 wherein the storage media comprises at least one of an optical storage media, an electronic storage media, an opto-electronic storage media, and a magnetic storage media.

13.(Original) A symbol detection method for a receiver of a MIMO communication system comprising:

receiving a multipath signal from M transmit antennas, M being an integer greater than one;

obtaining a data sample as a function of the received multipath signal; and

fitting the data sample to at least one point of an n-dimensional real signal constellation, wherein n=2M.

14.(Original) The method of claim 13 wherein the signal constellation consists of a plurality of points disposed among K subsets, wherein each point of a subset is disposed among one and only one of at least two n-1 real dimensional sub-constellations, and wherein a minimum distance between a point of one subset and a point of an adjacent subset is defined by a maximized minimum Kullback-Leibler distance, wherein K is an integer at least equal to one.

15.(Original) The method of claim 14 wherein each subset defines a closed arcuate surface.

16.(Original) The method of claim 15 wherein each closed arcuate surface is a sphere and further wherein each sub-constellation defines a circle.

17.(Original) The method of claim 14 wherein the at least two sub-constellations of at least one of the K subsets comprise at least one pair of sub-constellations defining x points, each said sub-constellation defining x points being disposed such that an origin of the constellation lies along an axis of symmetry defined by said pair.

18.(Original) The method of claim 17 wherein at least one of the K subsets further comprises an additional sub-constellation defining y points disposed symmetrically about the origin of the constellation, and wherein no other sub-constellation has at least y points.

19.(Original) The method of claim 17 wherein each of the subsets comprise a said pair of sub-constellations defining x points.

20.(Original) The method of claim 14 wherein fitting the data sample to points comprises recursively comparing the data sample to points of a sub-constellation of a subset until the data sample is matched to a constellation point.

21.(Original) The method of claim 14 wherein fitting the data sample comprises selecting an n dimensional real signal constellation from among at least two stored signal constellations based on the determined number M of transmit antennas, wherein one of the at least two

stored signal constellations defines n=2M real dimensions and another of the at least two stored signal constellations defines one of 2(M+1) and 2(M-1) real dimensions.

22.(Original) The method of claim 14 wherein fitting the data sample comprises determining one of a signal to noise ratio, a bit energy to noise power spectral density ratio, and a symbol energy to noise power spectral density ratio, and selecting an n dimensional real signal constellation based on the determined ratio.

23.(Previously Presented) A wireless communications system network element comprising:

storage means having stored upon it a digital representation of at least one n-dimensional real signal constellation defining a plurality of points, wherein each and every said point lies within one and only one of at least two (n-1)-dimensional real sub-constellations, wherein n=2M and M is an integer greater than one;

means for mapping a signal to the digital representation; and

at least one antenna for one of sending and receiving the signal.

24.(Previously Presented) The network element of claim 23 wherein the network element comprises at least one of a mobile station and a base station.

25.(Previously Presented) The network element of claim 23 wherein each sub-constellation defines a n-1 dimensional plane, said planes lying parallel to one another.

26.(Original) The network element of claim 23 wherein the at least two sub-constellations comprise at least one pair of sub-constellations each defining x points, each said sub-constellation defining x points being disposed such that an origin of the constellation lies along an axis of symmetry defined by said pair.

27.(Original) The network element of claim 23 wherein the plurality of points are disposed among K subsets each defining n real dimensions, wherein each point of a subset lies within

one and only one of at least two n-1 dimensional sub-constellations, wherein K is an integer greater than one.

28.(Original) The network element of claim 27 wherein the subsets each define a closed arcuate surface.

29.(Original) The network element of claim 28 wherein the closed arcuate surface defines a sphere.

30.(Original) The network element of claim 29 wherein the spheres are concentric.

31.(Original) The network element of claim 27 wherein a closest distance between points of adjacent subsets is defined by a maximized minimum Kullback-Leibler distance.

32.(Previously Presented) The network element of claim 23 wherein the means for mapping comprises a receiver for receiving the signal that includes noise, the network element further comprising:

means for storing a digital representation of a 2(M+1)-dimensional real signal constellation defining a plurality of points, wherein each and every said point lies within one and only one of at least two (2M+1)-1 dimensional real sub-constellations;

means for determining a ratio of signal power to noise power; and

means for selecting one of the signal constellations based on the ratio.

33.(Previously Presented) The MIMO communication system of claim 1, wherein either all points of the signal constellation or all points except one of the signal constellation are within the plurality of points.

34.(Previously Presented) The symbol detection method of claim 13, wherein said point is one of a plurality of constellation points, each of said plurality lying within one and only one of at least two n-1 real dimensional sub-constellations.

35.(Previously Presented) The symbol detection method of claim 34, wherein either all points of the signal constellation or all points of the signal constellation except one are within the plurality of points.

36.(Previously Presented) The wireless communication system of claim 23, wherein either all points of the signal constellation or all points of the signal constellation except one are within the plurality of points.

37.(Previously Presented) A receiver comprising:

means for receiving a wireless signal over a multipath channel from M transmit antennas;

means for obtaining a data sample as a function of the received multipath signal;

storage means having stored upon it a digital representation of at least one n-dimensional real signal constellation defining a plurality of points, wherein each and every said point lies within one and only one of at least two (n-1)-dimensional real sub-constellations, wherein n=2M and M is an integer greater than one; and

means for fitting the data sample to signal constellation.

38.(Canceled)

39.(Previously Presented) The receiver of claim 37, wherein the signal constellation consists of a plurality of points, a first point and a remainder of points, each of the remainder disposed on one and only one of at least two (n-1) real dimensioned sub-constellations of the said constellations.

40.(Previously Presented) The receiver of claim 37, wherein the means for receiving comprises at least one receive antenna, the means for obtaining comprises a digital sampler, and the means for fitting comprises a digital processor.